NOTICE OF FINAL RULEMAKING
MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS
RULE 358 – POLYSTYRENE FOAM OPERATIONS

PREAMBLE

1. Sections affected: **Rulemaking action:**

Rule 358 New Rule

2. The statutory authority for the rulemaking, including both the authorizing statute (general) and the statutes the rule is implementing:

Authorizing statutes: Arizona Revised Statutes, Title 49, Chapter 3, Article 3, Sections 479 and 480 (A.R.S. § 49-479, A.R.S. § 49-479)

Implementing Statute: Arizona Revised Statutes, Title 49, Chapter 1, Article 1, Section 112 (A.R.S. § 49-112)

3. The effective date of the rule:

April 20, 2005

4. A list of all previous notices appearing in the Register addressing the final rule:

Notice of Rulemaking Docket Opening, Arizona Administrative Register,
Volume #9, Issue #33, p. 3677, August 15, 2003.

Notice of Proposed Rulemaking, Arizona Administrative Register,
Volume # 9, Issue # 45, November 7, 2003.

Oral Proceeding, held December 11, 2003 and noticed in Arizona Administrative Register,
Volume # 9, Issue # 45, November 7, 2003.

Notice of Termination of Rulemaking, Arizona Administrative Register,
Volume # 11, Issue #7, February 11, 2005.

Notice of Rulemaking Docket Opening, Arizona Administrative Register,
Volume # 11, Issue #3, January 14, 2005.

Notice of Proposed Rulemaking Arizona Administrative Register,
Volume # 11, Issue #7, February 11, 2005.

Oral Proceeding, held March 17, 2005, and noticed in Arizona Administrative Register, Volume #11, Issue #7, February 11, 2005.

5. The name and address of agency personnel with whom persons may communicate regarding the rulemaking:

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6. Explanation of the rule, including the department's reasons for initiating the rule:

Historically the Maricopa County Rules and Regulations have not contained a source-specific rule to address pollutants from polystyrene foam operations. New Rule 358 addresses volatile organic compound (VOC) emissions that are emitted from the manufacture of expanded-polystyrene (EPS) foam products. Section 182 (a)(2)(A) of the Clean Air Act requires that Reasonable Available Control Technology (RACT) be applied in ozone nonattainment areas to each stationary facility that is a *major source* of VOC emissions. Maricopa County contains an ozone nonattainment area classified as "serious". Maricopa County has identified four facilities that expand polystyrene (EPS) to make foam products, each of which have uncontrolled VOC emissions that exceed the major source threshold of 50 tons per year. New Rule 358 incorporates reasonably available control technology. It is estimated that VOC emissions from the EPS foam industry will be reduced by 175 - 200 tons per year from 2001 levels due to new Rule 358.

The Basic Process: Regardless of what category of molded foam products an EPS foam facility specializes in, the basic processing steps are the same. The raw material is tiny plastic (polystyrene) beads that are made with liquid pentane incorporated within them. In a typical workday, several billion of these beads are heated by steam until the expanding pentane vaporizes, puffing up each bead from 10 to 50 times its original volume. The resulting “puff” globules are then cured by simply aging them in large containers exposed to air. Aging allows the hot plastic to cool and set, the steam-water to evaporate, and the pressure within each puff globule to equalize with atmospheric pressure. Aging also allows the EPS facility to regulate the amount of VOC that is in the puff in order to control the molding process.

Molding is the final processing operation necessary to produce a molded EPS product. In molding, the aged puff is first conveyed or blown into a mold. If all the curing goals have been accomplished and the VOC is in the proper range, when the mold is closed, pressure and heat applied for the programmed time, and then the mold finally opened, the finished product neither develops fissures and swellings from too much pentane nor does it crumble because there was not enough pentane to fuse all the puff particles together.

Of the four facilities affected by the emission standards of Rule 358, three are block-makers and one is a cup-maker.

Block makers' molds are typically 16 to 24 feet long and have a width and depth of 2 1/4 to 4 feet. The large foam blocks that emerge from these molds are typically cut into insulation boards and flat architectural shapes. The cup-maker has as many as 40 different types of molds and up to a few dozens of each mold-type to make everything from small coffee cups to soup bowls to large 44 oz. tumblers, depending on customer needs. Shape molding typically produces custom parts and custom packaging designed to exactly fit and surround an item to be shipped.

Each facility must both limit the amount of VOC that escapes to the atmosphere in the course of making the foam products and limit the amount of VOC left in the freshly molded product. The patterns of VOC emission from molded EPS products vary. Prior to any restrictions, up to 60% of the pentane in the raw EPS beads might be retained in freshly made blocks and cups. Pentane is a flammable liquid dissolved within the raw polystyrene EPS beads, that serves as a blowing agent to foam the polystyrene some 12 to 100 times its original volume, depending on whether a very dense or very light foam-product is desired.

Summary of Standards:

Section 301 sets VOC limits for block makers. Section 301.1 limits the sum of VOC retained in the resulting blocks and the VOC that escaped during processing to 3.0 pounds for every 100 pounds of raw beads processed for block makers. Block-makers will also be allowed an alternative standard in Section 301.2 for making very light (<0.8 pounds pcf) or very dense products (2.0 pcf or more) blocks from raw beads containing more that 5.5% VOC. Facilities that manufacture these products will be allowed to limit the sum of VOC retained in the resulting blocks and the VOC that escaped during processing to 3.9 pound for every 100 pounds of raw beads processed. This alternative standard is further restricted to apply to no more than 10% of total raw material processed in calendar year 2006, moving down 1 percent per year to a 5% limit in 2011 and thereafter.

Two of the block making facilities affected by Rule 358 each installed a new VOC-emission control system (ECS) in the period since January 2001 when development of the rule was first begun. These ECSs, each of which includes a regenerative thermal oxidizer (RTO), were designed to produce a level of VOC reduction that can meet the emission standards of the new rule.

A second sector of EPS industry produces shapes. There is one shape molding facility in Maricopa County. This facility emits less than 15 tons of VOC per year. Were a shape molder to process sufficient raw EPS beads in a year to potentially emit 50 or more tons of VOC annually, Section 302 limits that the sum of VOC left in the newly molded shapes and the VOC that escaped in processing to 2.7 pounds for every 100 pounds of raw beads processed. Based on research, Maricopa County believes that shape plants can meet the same 2.7 lbs./ 100 lbs. that California's Bay Area Air Quality Management District adopted in 1999. EPS shape manufacturers should be able to meet this standard through the use of lower VOC beads and capture and control of a portion of the process emissions.

A third sector of EPS industry produces cups. Section 303 of Rule 358 limits the sum of VOC retained in the resulting cups and the VOC that escaped during processing to 3.2 pounds for every 100 pound of raw beads processed. The cup maker located in the South Coast Air Quality Management District (SCAQMD) chose to control emissions up to molding and make operational changes to the aging process to comply with the SCAQMD rule. The cup maker in Maricopa County also indicated that they believe that front-end controls and operational changes will be the most cost effective strategy for the local plant.

A fourth sector of the EPS industry expands raw expandable polystyrene particles into ultra-light packing material called loose fill. No molds are used. Rather, the raw material is tiny EPS particles that are already shaped to produce the desired forms when expansion is complete. The only loose-fill maker in Maricopa County is still relatively small. If its potential to emit VOC increases from current levels of less than 20 tons per year to 50 tons or more, the facility would need to comply with Rule 358. Section 304 limits the sum of the VOC that escapes during the processing and the VOC left in the resulting loose fill to 2.4 pounds for every 100 pounds of raw EPS particles processed into finished loose fill. Based on research, Maricopa County believes that loose fill plants can meet a 2.4 lbs./ 100 lbs. standard like the Bay Area and South Coast air districts adopted in California. EPS loose fill manufacturers should be able to meet this standard by capturing and controlling both the bead expansion and puff-aging processes.

7. A reference to any study relevant to the rule that the agency reviewed and either proposes to rely on in its evaluation of or justification for the rule or proposes not to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:

1. Draft RACT Analysis of Rule 358 Expandable Polystyrene Foam, January 2005, Maricopa County Air Quality Department, Phoenix, Arizona.

2. BASF Corporation – Plastic Foams, Mt. Olive, NJ
   Technical Bulletin N-840, February 1999, Styropor® expandable polystyrene. Environmental – Pentane Emissions during Processing.

3. EPA/452/B-02-001 Control Cost Manual, September 2002, OAQPS, Research Triangle Park, N.C. 27711.

4. EPA "Control of VOC Emissions From Polystyrene Foam Manufacturing", OAQPS, Research Triangle Park, NC, Sept. 1990", EPA-450/3-90-020.

5. NOVA Chemicals®, Technical Memorandum, Pentane Material Balance M77B vs. M77BLV, Project No. DL-2001-140, Authors: Rick Hudson, Christine Hetzer, Confidential data.

6. PREMIER/INSULFOAM: Chino, California block/board plant. "Table 1: Residual Pentane-Testing Matrix". Blocks' Initial VOC-content as a function of the aging time of their constituent-puff.

7. South Coast Air Quality Management District Staff Report for Rule 1175, "Control Of Emissions From The Manufacture Of Polymeric Cellular (Foam) Products",1991, Laki Tisopoulos, et. al..

8. Bay Area Air Quality Management District Staff Report for Rule 8-52, "Polystyrene, Polypropylene and Polyethylene Foam Product Manufacturing Operations", Douglas Tolar, et. al., 1999.

9. WinCup/URS/Duane Morris Cost Analysis Of Post-Molding Controls/RACT Analysis For Pentane Emissions From Warehouse, WinCup – Tolleson, Arizona – November 3, 2003, December 2003, and January 2004.

10. WinCup informal study of VOC contents during various stages of cup production and after 18 and 22 days of storage, Corte Madera/Richmond CA operations.

11. WinCup informal study of VOC contents during various stages of cup production, April, June, November 2001. Specific details of this report may be confidential.

12. WinCup informal 6-week study at the Win-Cup Phoenix/Tolleson facility November and December 2002. VOC-contents of 4 different cup types (including 3 densities) determined when newly molded and after, respectively: 1 ,2, 3, 4, and 7 days; and after 2, 3, 4, 5, and 6 weeks. Specific details of this report may be confidential. 2003.

13. WinCup/URS Pentane Control Analysis Report for WinCup - Tolleson, Arizona, December 2001.

14. WinCup/URS RACT Control Cost Documentation (Supplemental to December 2001 Report), January, 2004.

8. A showing of good cause why the rule is necessary to promote a statewide interest if the rule will diminish a previous grant of authority of a political subdivision of this state:

Not applicable

9. The summary of the economic, small business, and consumer impact:

This economic statement (EIS) was developed to estimate the impact of the rule. The impact statement, comprising potential costs and benefits represents an estimate. Maricopa County has identified four facilities that expand polystyrene (EPS) to make foam products, each of whose uncontrolled VOC emissions exceed the major source threshold, 50 tons per year. Two of these facilities are Title V sources that expect to continue to emit more than 50 tons per year, even when controlling VOC emissions according to this rule. In addition, two of the four facilities recently installed new VOC-control devices. These two facilities provided information to the Department on actual costs for the new systems they installed. The Department used the actual costs to calculate cost effectiveness consistent with the methodology described in EPA Air Pollution Control Cost Manual – Sixth Edition (EPA 452/B-02-001), January 2002.

Two EPS block companies reported spending between $220,000 and $310,000 for their capital equipment. One of them also provided additional details. The County used the EPA default values to fill in the particular values which were not provided. Using this method, the cost effectiveness is $2,104 to $3,990 per ton of VOC reduced when the rule's standards are met. Based on limited

testing information, block makers will probably have to increase aging times for some products. Increasing aging time will require additional aging capacity to maintain current production levels. The cost of a 1,500 cubic foot aging-bag ranges from approximately $1,100 to $5,000 while other costs – equipment, direct installation, and indirect costs – total from $1,350 to $4,500. . If internal space is tight, vendors can also supply an external bead silo to expand aging capacity. The Department received an estimate for a 4,000 cubic feet silo of approximately $21,000 installed.

For the cup-maker, the County estimates a per-ton-reduced cost of $3,790 to $7,038; the midpoint estimate is $5,400. For these estimates, the County used data from the cost estimates submitted by the cup maker initially in 2002(ref.#13) for manufacturing processes and in 2004(ref.#9) for constructing total enclosures for storage, as well as quotes from oxidizer manufacturers. Both the cup maker and the County used methodology consistent with the EPA Cost[ref.#3)] manual. Actual costs may be lower if the company's existing means of VOC control has sufficient capacity to also serve additional enclosure(s). The range of cost effectiveness is derived from the range of VOC emissions in the testing information supplied by the cup-maker.

The following table summarizes the cost effectiveness calculations. The details of the cost estimates can be found in the RACT Analysis for Rule 358.

Table 1: Rule Cost Effectiveness

Production Volume of Block Facilities	Est. 2001 VOC Emission TPY	Est. VOC Emission with Rule 358 TPY	Total VOC Emissions Reductions TPY	Annual cost of new ECS from RACT Analysis Appendix A-2	Annual cost per ton VOC reduced*
Small block maker	63.1	27.7	35.4	$ 170,936	$ 4,824
Medium block maker	91.1	21.0	70.0	$ 147,322	$ 2,104
Large block maker	91.6	57.2	34.4	$ 137,267	$ 3,990
Cup-making facility	180.7	143.4	37.3	$ 201,929	$ 5,414*

- EPA range of ± 30% = $3,790 – $7,038 for cost of ton reduced.

Staff also estimates the four facilities will each spend between $320,000 and $697,500 in initial capital costs. As noted above assuming a 10 year depreciation cycle for the capital costs, staff estimates annual costs will range from $137,270 to $201,930. These costs include the depreciated capital costs, utilities, labor, etc. Staff estimates that these costs will have an impact of $0.02—0.04 per pound of raw beads processed.

An SEC Form 10-Q quarterly report ending September 24, 2004, by the parent corporation of a Maricopa County EPS manufacturer also includes a discussion of the cost of goods sold. Beginning in July 2003 through September 2004, market prices of styrene monomer, the primary raw material in Company's foam products, increased by 81% to $0.70 per pound. They further note that prices for styrene monomer are forecasted by independent industry surveys and producer reports to decrease to $0.68 per pound by the end of 2004 and to $0.55 per pound by the end of

2005. The report also indicated that the Company has been able to pass on the majority of past raw material price increases to customers. All facilities subject to Rule 358 will have to make compliance-cost decisions regarding controls, process changes, and whether or how mcuh of the compliance costs to pass on to consumers.

Economic Impacts On County Resources:

Maricopa County Air Quality Department has compliance and enforcement programs to handle VOC emissions from expandable polystyrene foam manufacturing. There will be some costs to Maricopa County due to the projected costs that accrue for implementation and enforcement of the new standards. However, it should not be necessary to adjust the Department's budget to implement this rule.

Health Costs:

Because Maricopa County is a serious nonattainment area for ozone, which these revisions address, it is imperative to consider the medical and social costs of failing to take steps toward the improvement of the air quality. Adverse health effects from air pollution result in a number of economic and social consequences, including:

1. Medical Costs -- Personal out-of-pocket expenses of the affected individual (or family), plus costs paid by insurance or Medicare, for example.
2. Work loss – Lost personal income, plus lost productivity whether the individual is compensated for the time or not. For example, some individuals may perceive no income loss because they receive sick pay, but sick pay is a cost of business and reflects lost productivity.
3. Increased Costs For Chores And Caregiving – Special caregiving and services that are not reflected in medical costs. These costs may occur, because some health effects reduce the affected individual's ability to undertake some or all normal chores. The affected individual may require extra care.
4. Other Social And Economic Costs – Restrictions on or reduced enjoyment of leisure activities, increased discomfort or inconvenience, increased pain and suffering, anxiety about the future, and concern and inconvenience to family members.

Rule Impact Reduction On Small Businesses:

A.R.S. § 41-1055 requires Maricopa County to reduce the impact on small businesses by using certain methods when they are legal and feasible in meeting the statutory objectives of the rulemaking. A small business is defined in A.R.S. § 41-1001 as a "concern, including its affiliates, which is independently owned and operated, which is not dominant in its field and which employs fewer than one hundred full-time employees or which had gross annual receipts of less than four million dollars in its last fiscal year. For purposes of a specific rule, an agency may

define small business to include more persons if it finds that such a definition is necessary to adapt the rule to the needs and problems of small businesses and organizations." The Department addressed this criteria through exemptions and conducting a RACT analysis on those industries that will be subject to the Rule 358. New Rule 358 exempts facilities from control requirements when the total VOC content of all raw EPS material processed is below 50 tons (100,000 lbs.) each calendar year and below 12,000 pounds each calendar month. This threshold reduced the number of small sources subject to the rule.

10. A description of the changes between the proposed rule, including supplemental rules, and final rule:

There were changes made to Rule 358 that are not substantive. The following non-substantive administrative changes were made between the text of the proposed rule and the text of the final rule to make the rule more concise and easier to understand:

Section 201- Changed the last sentence by deleting "the time and."

Section 401.1- Changed the section referred to from 502.2b to 502.2c.

Section 401.2- Deleted the phrase "and, for block-makers, Section 502.4."

Section 503- Final Subsection- Changed the incorrect subsection number, "503.8" to "503.9".

11. A summary of the comments made regarding the rule and the agency response to them:

RULE PREAMBLE

Comment #1: Because proposed Rule 358 has a direct effect on only one EPS cup molding facility, the RACT Analysis is, essentially, a source-specific finding of RACT for the WinCup facility. WinCup requests that the Rule contain an unambiguous statement that the chosen numerical standard (3.2 lbs VOC) is to be met by the application of the control strategy (pre-molding enclosure) identified as RACT by AQD in its RACT Analysis. WinCup acknowledges that a numerical standard that is not explicitly tied to specific control equipment provides flexibility for a source to meet the stated emission goal. However, this same flexibility leaves the proposed Rule open to misinterpretation. This is particularly true because the RACT Analysis does not establish a connection between the control strategy deemed to be RACT (pre-molding enclosure) and the numerical standard set by the proposed Rule (3.2 lbs. VOC).

Response #1: While WinCup is only cup manufacturer in Maricopa County, several other companies produce cups in various locations across the country. The Department reviewed RACT

regulations in other jurisdictions for cup manufacturing and sought information on how companies complied with those regulations. The Department must start with the standards from other jurisdictions already approved as RACT and justify any differences between the County's proposed standards and those already approved RACT standards. The Department did collect data and proposed to modify standards from Bay Area Air Quality Management District in California where we had appropriate justification. The RACT analysis citied in the preamble describes the justifications used to derive the 3.2 lbs standard for cups proposed in Rule 358. To summarize, the Department agreed to add a value of 0.4 lbs. to the Bay area standard of 2.8 lbs. to account for the residual VOC that would remain in products once they were shipped from the Phoenix plant. To arrive at 0.4 lbs. VOC, the Department reviewed all cup storage studies it had received. Since the rule requires that performance testing take place in summer, the Department chose an October data set from the Corte Madera facility (the warmest month among the data sets) and extrapolated the data from 22 days in that study to 28 days, the average storage period for the Phoenix plant as provided by WinCup.

In the South Coast Air Quality Management District (SCAQMD), Dart Container Corporation's California cup facility encloses and controls all pre-molding processes and actively ages pre-puff to meet the Rule 1175 standard of 2.4 lbs. VOC/100 lbs. The 3.2 standard for EPS cups in Maricopa County's Rule 358 is 0.8 lbs. higher than the analogous standard required of Dart Container by Rule 1175. Once a successful strategy for complying with the rule is identified, the Department does not preclude the use of other techniques or systems that may be used to comply with a rule. For example, we do not reject the use of post-molding emission control or control of selected molding emissions as potentially viable parts of an overall RACT strategy. Should a facility choose not to capture all VOC emitted prior to molding or to modify aging practices, other combinations of cost-effective solutions can be implemented. For example, some of the test data submitted to the Department indicate molding losses of 0.8 lbs VOC/100 lbs. and storage losses of 1.0 lbs VOC/100 lbs. over the first 24 hours. Smaller controlled enclosures of molding or storage areas for individual high volume products with either of these two emission rates can be cost effective.

The Department assumes that a period of adjustment to research, experiment, and train staff will be required in order for an affected EPS molder to change manufacturing practices to meet the applicable standard in the proposed rule. Dart reports that the company implemented significant changes in control equipment and manufacturing practices and developed new quality control procedures in order to comply with the South Coast standard.

Comment #2: Wincup believes that the preamble (Notice of Proposed Rulemaking) incorrectly creates an impression of commonality between segments of the EPS industry that are actually very different. WinCup acknowledges that there are superficial similarities between these operations: each uses pentane-impregnated polystyrene resin as a raw material, each expands the raw material through the application of heat, usually in the form of steam, and each, to differing degrees, molds the product as a final or intermediate step in processing. However, for the purpose of this rulemaking, it is the categories of EPS facilities widely differ. Block manufacturers, for example, operate in a batch process, use extremely large molds, and manufacture products that require a post-molding curing process, and often both molding and curing processes are accomplished in enclosed areas suitable for venting. Cup manufacturing is a continuous process that requires no curing of the product. Cup products are immediately wrapped and boxed, ready for off-site shipment. Cup molding and storage occur in extremely large open manufacturing spaces that are not conducive to capture of fugitive emissions.

Response #2: The intent of this section of the preamble was to describe the basic process for manufacturing expandable polystyrene products. Further detail that distinguishes various product manufacturing sectors can be found in the RACT analysis cited in the preamble. In the comment, the distinction made between manufacturing spaces and the post-molding experiences of cups versus blocks differs from the Department's perception of the situation. In Maricopa County, block manufacturing and storage also occur in extremely large open spaces. All of the block manufacturers have installed or are in the processing of installing enclosures and controls for processes through molding. Blocks can be shipped out almost immediately after they are molded. Although a block does need to cure before it is cut, the customer can do the curing. The curing is essentially a holding period during which a block is kept out of the rain/snow sufficiently long to evaporate the moisture that was injected into it as steam during the molding process. There is rarely an advantage to shipping immediately, so the blocks normally are held at the block-making facility to cure. During the summer in Phoenix, most blocks that are protected from rain cure within five days.

Cup delivery to retail or wholesale customers directly after packaging rarely occurs. Because of the flammability hazards associated with both the high pentane content of fresh cups and the pentane that diffuses from these cups into the packaging, cups remain within the manufacturer's warehousing and distribution system for a period of time. Like blocks, fresh molded, packaged cups can be shipped immediately if properly supervised. Most cup facilities also hold their new products in the facility's own on-site warehouse before the cups are shipped to customers. In study of storage times, the Phoenix WinCup facility indicated that the average storage period was 28 days.

Comment #3: WinCup believes that the numerical standard may have been set at a level that is beyond the reach of RACT. Certainty this issue requires additional technical review (and such review should be completed prior to the necessary re-publication of the proposed Rule). However, should the stated emission limit prove too stringent (i.e. beyond RACT) for the WinCup facility, one logical modification to the Rule might be to adopt an alternate operating scenario for certain cup products. WinCup believes it would be prudent to note in this section of the Rule the specifics of each EPS manufacturing segment's processes and emission characteristics to further justify the necessary variation in the RACT requirements for each facility and/or for the varying methods of measuring compliance with the Rule.

Response #3: While WinCup indicated in a phone conversation that their initial experiments hadn't always worked, WinCup has not yet supplied the Department with documentation that the numerical standard cannot be met. At this time, the experience of the Dart Container Corporation operation in Corona provides evidence that compliance with an even tighter numerical standard is possible. Should WinCup experience difficulties, however, the Department will work with WinCup and EPA to revise Rule 358. With additional documentation and justification that will meet EPA's criteria, we may be able to develop a more flexible standard for problematic products. To date, staff has not received documentation that would support an averaging option or any other alternate operating scenario for certain cup products or been involved in discussion as to what documentation will be necessary.

The Department again notes that the RACT Analysis cited in the preamble contains the specifics of each EPS manufacturing segment's processes and emission characteristics. The analysis also justifies the necessary variation in the RACT requirements for each product sector.

Comment #4: WinCup understands the purpose of this section of the Rule preamble is to identify the basis for the level of emission control applicable to EPS cup manufacturing. However, the statements made in this section, when taken together, do not explain the basis for AQD's choice of a 3.2 lbs. VOC emission standard or how that emission standard relates to the pollution control strategies investigated in the RACT Analysis.

WinCup believes that this provision of the preamble should first contain a summary of the RACT Analysis as it relates to the choice of control equipment deemed to be RACT for the WinCup facility. The preamble should also identify those control measures that were reviewed in the RACT Analysis and deemed either technically or economically unreasonable. This would include a clear statement that molding and post-molding controls are not RACT for the WinCup facility.

This revision would add clarity to the specific control techniques that AQD is requiring cup manufacturers to implement in order to meet the promulgated standard.

Response #4: The purpose of the summary of proposed standards section of the preamble is to list the standards proposed in the rule with a brief description. The text in the section also describes how a source might comply with the standard. The Department does not describe the basis for the level of control nor list all the possible control options in this section of the preamble. See comment #1 for a discussion on the basis for the proposed standards and pollution control strategies and techniques.

Comment #5: AQD should also provide in this preamble (and in the RACT Analysis) a technical explanation of how EPS cup facilities can meet the numerical standard (3.2 lbs. VOC) through use of a pre-molding enclosure and operational (pre-puff aging) changes. This explanation must account for the applicability of the referenced operational (aging) changes to the specific products (each of which has a unique specification) at the WinCup facility. At present, both the RACT Analysis and the preamble to the proposed Rule are devoid of such analysis. The general reference to a "cup maker located in South Coast Air Quality Management District," without accompanying specific information about its products and processes, is not meaningful.

Response #5: The Department does not recommend any specific technology to comply with a rule. Generally, the Department does provide information on the most probable technology that will be utilized. Like Dart's Corona facility, the Department anticipates that Phoenix Wincup facility will also have to experiment with various process control and aging options to comply with the rule standards. The commenter is asking that the Department obtain and share confidential business information (CBI) from its competitor as to operation specific data. The Department lacks standing to obtain CBI from a source not under County jurisdiction. Furthermore, if the Department did obtain process and product specific data identified as CBI, the Department could not legally share that information with WinCup. In addition, the WinCup facility has not provided the Department with that level of detail on all of its own operations and did identify CBI in the information and data it did submit, precluding mention of that data in public documents.

However, the Department did contact Dart Container Corporation to collect additional information on product types manufactured at the South Coast cup maker as requested by the commenter, and received the following response:

"On behalf of Dart Container Corporation, we feel obligated to provide the following information in response to your inquiry. Please know that we consider much of our process as proprietary, however the information you requested is available from our sales department or could be obtained by testing commercially available products.

The Corona, CA facility produces molded cups and containers from beads using the EPS steam molding process. We consider the Corona facility to be capable of producing our entire product line with no changes to our corporate product specifications. From this plant, we manufacture and ship a broad product line which includes various style and sizes of drink cups, molded foam lids, bowls and containers, including containers that are sold to soup manufacturers for use as packaging. The range of product densities used to manufacture these products is between 2.2 to 4.2 pounds per cubic feet. There are a few items that are imported and then distributed from this location because it is not economically effective to maintain the tooling to produce them in small volumes. This is an economic and logistic decision, not a technical one. Noodle cups are not one of these items.

The products produced at Corona are subject to the same specifications and requirements met by all the other Dart plants as judged by our national customers and our corporate quality group."

Based on the data WinCup has submitted to the Department so far, most of WinCup's product line is very similar to the Dart product line with similar densities. In an e-mail dated April 12, 2005 WinCup informed the Department that they also produce some products with densities exceeding 5 pcf.

In Appendix A-2, Table II of the RACT Analysis, the Department outlined the costs of front-end control, including a new RTO installation, a total enclosure, and an aging system that uses waste boiler heat. This estimate is conservative in that it deliberately overprices the active aging system with its heat exchanger and makes no use of the existing additional boiler capacity that, nonetheless, is currently available to oxidize some of the VOC emissions. The dimensions of the total enclosure were given to AQD by a WinCup environmental engineer. Costs for material and its installation for constructing the enclosure were adapted from the "WinCup/URS/Cooley Cost Analysis Of Post-Molding Controls, December 2003". The cost per ton reduced is given as $5,414. Using EPA's costing-span convention, namely ±30%, the high cost is $7,038 and the low, $3,790. These costs are also summarized in the economic impact summary in section 9 of the rule preamble.

Comment #6: One commenter asked that company names be removed from the summary table in the economic impact section of the preamble in the notices of rulemaking.

Response #6: We inserted general type and size descriptions in place of facility names.

Comment #7: One commenter asks why the 2001 emissions estimated in the Notice of Rulemaking differ from those earlier accepted by the Department.

Response #7: The emissions test at the commenter's facility lacked any determination of VOC capture efficiency by the emission control system. Therefore, there was no basis provided by the source test on which to base an emission factor. The permit engineer assigned to the facility in the last 2 years used emission factors that are different from the emission factors used by AQD's Inventory Section in 2002 to estimate 2001 emissions. These factors were influenced by investigations at the site in 2003 and 2004 by EPA and Maricopa County that pointed to a much smaller capture of aging emissions than was previously assumed, and assigned substantial emissions during the period between molding and shipping the products.

Comment #8: WinCup requests that the Rule reference sections be made to conform to the RACT Analysis references. Such conformance will assist in the interpretation of the Rule and any inferences derived from the technical information that AQD used to support its findings. Furthermore, WinCup notes that information it provided to AQD during the rulemaking is discussed in several sections of both the RACT Analysis and the preamble, but is either incorrectly cited or omitted from the appropriate reference sections. WinCup requests that specific citation to the following submittals be added to the reference list in the RACT Analysis and the Notice of Proposed Rulemaking:

WinCup/URS Pentane Control Analysis Report for WinCup - Tolleson, Arizona, December 2001

WinCup/URS RACT Control Cost Documentation (Supplemental to December 2001 Report), January, 2004.

Response #8: References have been cited and/or corrected and the 2 references were added to the reference list in the RACT Analysis and the Notice of Proposed Rulemaking

Comment #9: WinCup notes that the basis for this cost estimate and the use of cost data provided by WinCup is unclear. WinCup requests that this provision of the preamble and the corresponding

discussion of WinCup-specific control costs in the RACT Analysis specifically reference WinCup's submittals on this matter. These references would include, at a minimum, the following: WinCup/URS Pentane Control Analysis Report, December 2001,

WinCup/URS RACT Control Cost Documentation (Supplemental to December 2001 Report), January, 2004 and

WinCup/URS Cost Analysis Of Post-Molding Controls, December 2003.

Comment #9: The following text that explains the cost calculations has been added to the Final Notice of Rulemaking and the RACT Analysis:

In Appendix A-2, Table II of the RACT Analysis, the Department outlined the costs of front-end control, including a new RTO installation, a total enclosure, and an aging system that uses waste boiler heat. This estimate is conservative in that it deliberately overprices the active aging system with its heat exchanger and makes no use of the existing additional boiler capacity. The dimensions of the total enclosure were given to AQD by a WinCup environmental engineer. Costs for materials and installation for constructing the enclosure were adapted from the "WinCup/URS/Cooley Cost Analysis Of Post-Molding Controls, December 2003". The cost per ton reduced is given as $5,414. Using EPA's costing-span convention, namely ±30%, the high cost is $7,038 and the low, $3,790. These costs are also summarized in the economic impact summary in section 9 of the rule preamble.

The WinCup/URS Cost Analysis Of Post-Molding Controls, December 2003, was also added to the reference list in the preamble.

COMMENTS ORGANIZED BY SECTION NUMBER

Section 200: Definitions

Comment #10: Two commenters requested that the word "time" be removed from Subsection 201 the definition of bead-lot and bead-lot identifier. They noted that manufacturers only list the date and do not list the time of packaging.

Response #10: The Department agrees and removed the word "time" from the last sentence of the definition.

Comment #11: Subsection 215.1 and 215.2 refer to ASTM designations. ASTM does not use the symbol "# "or the abbreviation "No." when referring to its standards or test methods. The references to ASTM designations should read ASTM Method C303.

Response #11: The "#" symbol has been deleted from the ASTM references in both rule 358 and the RACT Analysis.

Section 300: Standards

Comment #12: There were several comments from the same commenter requesting that the time period for determining compliance with the standards in Section 301 be one year. The commenter further notes that Subsection 301.1 contains a VOC "emission" limit, but there is no mention of the emission limit averaging time (instantaneously, hourly, daily, or yearly). Due to inherent process variability and upset conditions, sources may not be able to achieve continuous compliance based on an instantaneous, hourly or even daily average emissions basis.

Response #12: The standard in Subsection 301.1 is based on a point-in-time determination. The point-in-time standard must be met during each day of operation and for each product-type produced. In practice, determination of compliance is made within the time parameters set in the source test protocol. Such parameters are determined by the Department in consultation with the testing contractor, according to the nature of the EPS processes and the characteristics of the particular test method(s) chosen.

Comment #13: In Section 301.1 the block standard states: "Limit the sum of both the VOC that escaped to atmosphere and the residual VOC in the resulting blocks at the time they are released from the molding machine to not more than 3.0 pounds for every 100 pounds of raw beads processed".

The commenter is concerned that the RACT evaluation has not thoroughly evaluated the potential impact of this requirement on local molders. Specifically, it is not clear that the evaluation includes sufficient technical justification for the proposed standard. It follows that the technical and economic feasibility may not have been established to the degree required by the relevant statutes (e.g. ARS 49-112(A)). The commenter expressed concern that the standard is based on limited information. The RACT analysis, in section 8.4, indicates that the standard was based in large part on data collected at two of Premier's facilities. The commenter points out the following with respect to that data:

a. The tests were run using only a limited number of EPS bead types,

b. Relatively few data points were collected for each bead type/product type combination,

c. As the analysis points out, the tests were experimental, and were not intended to reflect normal aging times at the facility. The twenty-four hour aging periods that were tested were intended to determine the degree to which extended aging times might reduce block residual contents, but were neither intended nor advertised as technically or economically feasible alternatives for continual operation. Twenty-four hour aging periods are not "normally encountered", as implied by the RACT evaluation, for the majority of our production.

Response #13: When developing the Rule 358 standards, the Department reviewed RACT regulations in other jurisdictions for expandable polystyrene foam manufacturing and sought information on how companies complied with those regulations. The Department must start with the standards from other jurisdictions already approved as RACT and justify any differences between the County's proposed standards and those already federally approved RACT standards. The Department did collect data and proposed to modify standards from Bay Area Air Quality Management District and the South Coast Air Quality Management District in California where we had appropriate justification. The data sets supplied by Premier provided justification for the 3.0 lbs. standard in Rule 358 that is 0.3 lbs. higher than the Bay Area standard and 0.6 lbs. higher than the South Coast standard.

The number of EPS bead types and data points collected is typical for testing performed by an individual company. While the tests were run using a limited number of EPS bead types, the tests demonstrate that the Rule 358 standard can be achieved. Furthermore, the tests also used a bead model that is representative of a significant quantity of mid-range beads used in this region with actual VOC contents near the maximum normally encountered with using mid-range VOC beads. Local manufacturers have begun using mid-range and low-VOC beads. They may also be able to switch to beads containing lower percentages of iso-pentane in the blowing agent. The use of low VOC materials or reformulation of raw materials is a strategy frequently selected by many industries to comply with various air quality regulations

Based on the tests, not all products would have to be aged 24 hours. In addition, these tests were performed from November through January during meteorological conditions that generally require longer aging periods. While Premier may not age for 24 hours, other local block makers do age for longer periods of time. Generally, 24 hours is the maximum normal aging time. To minimize the impact of extended aging periods, the Department did anticipate that facilities would probably install additional aging capacity to maintain production schedules. Another option may involve the installation of hot rooms to actively age pre-puff.

The Department's analysis shows that the installation of the additional controls is cost effective ranging from approximately $2100 to $4800 per ton VOC reduced. The cost of a 1,500 cubic foot aging-bag ranges from approximately $1,100 to $5,000 while other equipment, direct installation, and indirect costs range from $ 1,350 plus $4,500. The Department received an estimate for a 4,000 cubic feet silo of approximately $10,000 including ducting and other equipment, direct installation, and indirect costs will be approximately another $10,000. If internal space is tight, vendors can also supply an external bead silo to expand aging capacity. For example, if a plant doubles its aging capacity, the amortized costs per ton will range from $240--$300 for silos and $22--$26 if bags are chosen. Adding in annual operating costs could increase this estimate to $500 per ton controlled, increasing the expenditures cited above to $2600 to $5300 per ton, an amount still well within the RACT cost range.

Like the other block manufacturers in Maricopa County and California, Premier will face compliance-cost decisions about changing raw materials, aging processes and equipment, and add-on control equipment. They will also face decisions about passing on increased compliance costs to consumers.

Comment #14: The RACT evaluation does not thoroughly evaluate all impacts. The RACT document mentions on a number of impacts associated with demonstrating compliance with the standard, without providing thorough evaluations of the resulting technical and economic difficulties, or providing justification that such evaluations are not necessary.
Specifically, lower pentane content beads have limited availability. The RACT document itself recognizes that two-thirds of beads currently available in the market have pentane contents in excess of 5.0%,

Response #14: The RACT document further points out that only the supply of low-range VOC beads is actually less than the demand for the beads. Furthermore, all of the block manufacturers in Maricopa County have been using mid-range VOC beads for at least the last 18 months to 2 years. They all face similar market conditions and must make the same compliance-costs decisions regarding the purchase of raw materials. The rule does contain a limited alternative operating scenario that allows the use of high VOC beads to manufacture very light and very dense products. The rule does not necessarily preclude a plant from using higher VOC beads to produce other products, though, obviously, additional processing and expense would be necessary to comply with the standard.

Comment #15: Products produced with lower pentane beads have more limited capability to "take" recycled foam. Due to physical performance requirements as well as cosmetic requirements, the amount of regrind that may be added to a specific product is relative to the pentane content of the fresh or "virgin" bead. Products manufactured from higher pentane beads can be made using a higher proportion of regrind than can those with lower pentane contents. Therefore, a push to lower pentane content will limit the amount of regrind that can be added, resulting in a higher proportion of virgin bead (and emissions) per pound of product than might otherwise be necessary.

The regrind that cannot be put into the product will also have to be taken to the landfill for disposal. Both of these impacts will result in an increase in the cost of production. The RACT evaluation should demonstrate that these environmental and economic impacts are justifiable. The rule should also make explicit allowance for considering regrind in the calculation of compliance with the standard, to help offset these negative impacts.

Response #15: The standard is designed to be met using mid-range VOC beads. Local manufacturers are able to include regrind with mid-range VOC beads and can utilize the scrap they produce at current production levels if they choose. Furthermore, the Department recently issues a permit to construct and operate a new business that combines ground up EPS waste with concrete to form building blocks. This firm will provide a market for EPS scrap. There is no basis to make the revisions suggested by the commenter.

Comment #16: The evaluation appears based on the need to age mid-pentane beads as long as 24 hours in order to meet the standard. For the lower density products, the bulk of production, this could result in a significant increase in the facility's normal aging time. In those cases, compliance could require either curtailing production, or significantly expanding the size of the aging process. Either of these requirements would result in economic impacts that are not addressed by the RACT evaluation. The RACT evaluation mentions the importance of quick turnaround requirements between product orders and shipment, but does not evaluate the impact of increased production (aging) time on that requirement.

Response #16: See Response #12. The Department will include the cost analysis for additional aging capacity into the notice of final rulemaking. Another option that Premier fails to mention would be the installation of a hot room around the aging space to decrease the amount of time necessary to further reduce VOC during aging. To summarize, Premier will have several options, other than curtailing production, for aging process modifications that will minimize impacts on current production practices and have relatively low cost increments

Comment #17: There were some reasonable, alternative wordings proposed for expressing the provisions in Sections 301.1 and 301.2.

Response #17: These suggestions helped guide the final version, which was the result of a group consensus process.

Comment #18: In Section 301.2, we want the initial, annual allowance for Specialty Products of 10% of annual-throughput to be unaltered in the future, not steadily reduced by 1% per year to 5% of throughput for all years after 2010. There are presently being developed many new products that use ultra high density foam for new applications as well as old. In time these products may become an important commodity sector of the expanding polystyrene industry. For that reason, we want you to justify the reduction spelled out in Table I.

Response #18: In granting subsection 301.2, as an alternative operating scenario, EPA construed it loosely as an exemption for raw beads used to make specialty products of unusual densities. Some more advanced facilities can make most or all of these specialty products while complying with the primary standard of subsection 301.1. While allowing initially up to 10% of raw materials to fall under this alternative for making specialty products, EPA wanted the rule ultimately to parallel a particular EPA policy, termed the "5 percent equivalency rule". This policy limits the total emissions from all exemptions in a new RACT rule to not more than 5% of total annual emissions predicted once a RACT rule has been fully implemented without any exemptions. By limiting total use of the alternative operating scenario after 2010 to 5% of annual raw material use, the effect will be to put Rule 358 essentially in compliance with the 5 percent equivalency rule. While technically, the theoretical maximum emissions could be up to 8% of emissions under a no-exemptions RACT after 2010, actual emissions from specialty products is currently no more than 5% of total emission predicted when Rule 358 is fully in effect.

Comment #19: The rule should make clear that other sources of VOC emissions (boilers, RTO) are not included in the compliance calculus [for the standards in Sections 301.1, 301.2, 302, 303, and 304].

Response #19: Specifically, anything used within the ECS is part of the compliance calculation. Generally, the following sources may be excluded in determining compliance with any standard in Sections 301.1, 301.2, 302, 303, and 304, provided the releases don't take place within the ECS. For example, VOC emissions from any boiler, from solvent cleaning, and from product printing/labeling devices, may be excluded, though the sources are subject to the requirements of

other Maricopa County Air Pollution Control rules. However, the Department may review the circumstances of any specific facility, as necessary, on a case-by-case basis to determine which sources are excluded.

Emissions from control devices are included in the compliance calculation. These emissions are subject to measurement during a test of compliance with a Rule 358 standard. The measurement is used in the mass balance equation(s) to determine the critical value: the total amount of VOC that escaped to atmosphere. Emissions from those VOC control devices that are used to meet a standard are restricted by the provisions under Section 305.

Comment #20: WinCup believes that AQD has not demonstrated a rational basis between the emission standard represented in Section 303 and the control technology identified in the RACT Analysis for cup manufacturing operations. To determine what additional emission controls would be reasonable for the WinCup facility, RACT methodology required AQD to evaluate available control technology for the facility and then estimate the corresponding emission reduction caused by the hypothetical application of such technology. In each iteration of this analysis, the cost of control per additional ton of VOC reduced (on an annual basis) was estimated and compared to a predetermined range of reasonably acceptable costs. The AQD has represented reasonably acceptable costs to be in the range of $7,000-$8,000 per additional ton of VOC removed. Control measures whose cost exceeded this threshold were eliminated as being beyond RACT; control measures within this range were retained for consideration.

For the WinCup facility, AQD eliminated control of molding emissions and control of post-molding emissions as having a cost threshold that exceeded RACT. In recent conversations, AQD and Maricopa County confirmed to WinCup that the present version of Rule 358 is not intended to require control of these emissions. RACT for the WinCup facility has been identified in the RACT Analysis as the enclosure of the WinCup manufacturing process prior to cup molding (i.e., the "front end") within a Permanent Total Enclosure ("PTE") and the venting of captured emissions to a control device. On this basis AQD estimated that the chosen control measure would reduce VOC emissions by an additional 37 tons per year at the WinCup facility. However, AQD does not explain either in the RACT Analysis or in the Rule how it derived the current Section 303 standard (i.e., 3.2 lbs VOC) from the emission reductions it predicted in the RACT Analysis.

The only discussion of the derivation of the numerical standard (3.2 lbs VOC) is contained in the RACT Analysis, where AQD states that "Maricopa County added the residual VOC from finished cups stored 28 days in Phoenix, 0.4 lbs. VOC, to a SIP approved Bay Area standard, 2.8 lbs. VOC/100 lbs. beads, to derive the 3.2 lbs. VOC/100 lbs. beads standard as proposed." See RACT

Analysis, Section 10 at p. 42. No further explication or explanation is provided as to the basis for the Bay Area (California) 2.8 lbs VOC standard, or as to the source of the cited 0.4 lbs. residual VOC value in the Phoenix plant cups. Rather, AQD has simply adopted (albeit with slight modification) a standard from another jurisdiction without consideration of whether that standard is consistent with AQD's own RACT Analysis. The Section 303 standard is therefore arbitrary and without basis.

Response #20: While WinCup is only cup manufacturer in Maricopa County, several other companies produce cups in various locations across the country. The Department reviewed RACT regulations in other jurisdictions for cup manufacturing and sought information on how companies complied with those regulations. EPA has approved at least 2 RACT rules in Region IX for expandable polystyrene foam manufacturing. Since the other federally approved RACT rules exist, the Department must use those rules as a starting point in its development of standards. The Department must start with the standards from other jurisdictions already approved as RACT and justify any differences between the County's proposed standards and those already approved RACT standards. The Department did collect data and proposed to modify standards from Bay Area Air Quality Management District in California where we had appropriate justification. The Department does not believe that the Section 303 standard is arbitrary and without basis.

The RACT analysis citied in the preamble describes the justifications used to modify the Bay Area 2.8 lbs. standard and derive the 3.2 lbs standard for cups proposed in Rule 358. To summarize, the Department agreed to add a value of 0.4 lbs. to the Bay area standard of 2.8 lbs. to account for the residual VOC that would remain in products once they were shipped from the Phoenix plant. To arrive at 0.4 lbs. VOC, the Department reviewed all of the long-term cup storage studies it had received. Since the rule requires that performance testing take place in summer, the Department chose an October data set from the WinCup Corte Madera facility (the warmest month among the data sets) and extrapolated the data from 22 days in that study to 28 days, the average storage period for the Phoenix plant as provided by the WinCup Phoenix plant.

In the South Coast Air Quality Management District (SCAQMD), Dart Container Corporation's California cup facility encloses and controls all pre-molding processes and actively ages pre-puff to meet the Rule 1175 standard of 2.4 lbs. VOC/100 lbs. The 3.2 standard for EPS cups in Maricopa County's Rule 358 is 0.8 lbs. higher than the analogous standard required of Dart Container by Rule 1175. Once a successful strategy for complying with the rule is identified, the Department does not preclude the use of other techniques or systems that may be used to comply with a rule. For example, we do not reject the use of post-molding emission control or control of selected molding emissions as potentially viable parts of an overall RACT strategy. Should a

facility chose not to capture all VOC emitted prior to molding or to modify aging practices, other combinations of cost-effective solutions can be implemented. For example, some of the test data submitted to the Department indicate molding losses of 0.8 lbs VOC/100 lbs. and storage losses of 1.0 lbs VOC/100 lbs. over the first 24 hours. Smaller controlled enclosures of molding or storage areas for individual high volume products with either of these two emission rates can be cost effective.

The Department assumes that a period of adjustment to research, experiment, and train staff will be required in order for an affected EPS molder to change manufacturing practices to meet the applicable standard in the proposed rule. Dart reports that the company implemented significant changes in control equipment and manufacturing practices and developed new quality control procedures in order to comply with the South Coast standard.

Based on the Dart experience and WinCup's stated preference for front-end modifications, the Department believes that WinCup may be able to comply with the Rule through front-end modifications. However, that belief does not preclude the use of other combinations of solutions mentioned in the prior paragraph. WinCup, like Dart, will face compliance-cost decisions about installing controls and implementing process modifications.

Comment #21: WinCup also notes that BAAQMD Rule 8-52 was promulgated as a California BARCT ("Best Available Retrofit Control Technology") rule and does not represent RACT even within the Bay Area. Under California regulation, BARCT limits are more stringent than RACT limits for the same source. See, e.g., Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology For Adhesives And Sealants, State of California Air Resources Board, December 1998 at p. 11. Consequently, AQD can not arbitrarily adopt the Rule 8-52 standard as the basis for a RACT rule because, by definition, the Bay Area rule is not a RACT rule.

Response #21: Both the Bay Area Rule 8-52 and South Coast Rule 1175 were submitted to EPA to satisfy the requirements to implement RACT under Sections 172 and 182 of the Clean Air Act. In referencing the California document, the commenter overlooked the word "Generally," that began the referenced statement. RACT and BACT or BARCT may be the same, particularly when add-on control technology is utilized as part of a control technology determination. The Department modified the Rule 8-52 standard increasing it by 0.4 lbs. and, therefore, does not believe that action is arbitrary.

Comment #22: WinCup continues to object to the reference in Section 303 that the residual VOC content in finished product that has already been shipped from the plant be measured against WinCup's compliance with the proposed standard. AQD has perhaps attempted to respond to this continuing objection in its derivation of the Rule 303 standard. The RACT Analysis states that AQD has modified the proposed standard by adding "the residual VOC from finished cups stored 28 days in Phoenix, 0.4 lbs. VOC,' to [the] SIP approved Bay Area standard." See RACT Analysis, Section 10 at p. 42. WinCup views this statement as an acknowledgement by AQD that Maricopa County lacks jurisdiction to regulate WinCup's finished product once it is shipped from the manufacturing facility. However, the proffered AQD solution seems arbitrary: on one hand, the explanation of the standard indicates that residual VOC content was effectively removed from consideration yet; on the other hand, the Rule itself seems to state that such VOC content must be included. WinCup believes that the proposed Rule should be clarified to exempt such emissions from Rule 358 consideration.

Response #22: Since it is not practical or cost effective to test each shipment for VOC content when it leaves the plant, the Department had to develop a surrogate standard that could be applied at a set point in the process. The Department modified the Bay Area 2.8 lbs. standard by adding 0.4 lbs as representative of the summertime average residual VOC content to address WinCup concerns. This approach removes the necessity to address residual VOC at shipment in the rule. The Department uses surrogates in rules when ascertaining actual emissions of specific processes is impractical. The Department does not believe that the standard is arbitrary or that the Rule needs further clarification.

Comment #23: Irrespective of the nature of the BAAQMD rule (i.e., RACT, BARCT, etc.), AQD is required to demonstrate the technical and economic feasibility of applying the BAAQMD 2.8 lbs. VOC rule (plus residual VOC in finished products when shipped) in Maricopa County. The record indicates that no such analysis was performed. In fact, in an earlier version of the RACT Analysis, AQD compared emission capture cost estimates for the Phoenix facility and those made by BAAQMD for the Corte Madera facility and acknowledged that there were significant differences between the facilities. Draft RACT Analysis, November 2003. AQD noted that for identical control measures, the Phoenix facility cost estimate contained "extensive capture provisions" due to the fact that there was "at least 50% more space in the Phoenix cup plant as in the Bay Area cup plant making ducting and duct supports much more extensive and expensive." Draft RACT Analysis, November 2003 at p. 29-30. This language is not present in the current RACT Analysis, but it demonstrates that AQD has knowledge of the operational differences between the WinCup facilities. AQD must demonstrate the feasibility of a Section 303 standard based on the physical structures and layout of the Phoenix plant, not some other plant. AQD can

not simply borrow the BAAQMD 2.8 lbs. VOC standard and assume either its validity for the Bay Area plant or its applicability to the Phoenix plant.

Response #23: As already noted in responses 5 and 9, the cost analysis of front-end controls and active aging for the WinCup Phoenix plant was based on actual dimensions supplied by WinCup and found to be cost effective. The differences in sizes and plant layout between Phoenix and Corte Madera are not germane since the cost analysis was specific to the Phoenix plant physical structure and layout. Furthermore, the Dart plant in Corona meets a South Coast standard 0.8 lbs. less than the one proposed in Maricopa County. Given that example, the Department does not believe that the commenter's characterization of the Department's standard setting process is accurate.

Comment #24: Based on prior discussions between the parties, as AQD knows, WinCup has evaluated the technical feasibility of the proposed Section 303 standard independent of the legal shortcomings of the Rule. WinCup has provided numerous data sets to AQD demonstrating that, under current operating conditions, the pentane content of pre-puff being fed to the molding machines varies from roughly 3.3 to 3.9% pentane. During the development of the proposed Rule, WinCup discussed with AQD the use of increased aging time as a method for driving down the pentane content of the pre-puff prior to molding. WinCup explained that there is a limit to the amount of bead aging possible before product quality becomes unacceptable.

WinCup has advised us of its belief that high density products, which make up approximately one third of production, need to be molded with beads that contain minimum pentane levels at or slightly above the proposed Section 303 standard. These findings were previously convened to AQD during the rule making process. AQD's failure to consider and analyze the extent to which product quality will be impaired by aging pre-puff is arbitrary and capricious.

Response #24: The Department recognizes that there is a limit to the amount of bead aging possible before product quality becomes unacceptable. However, the Department was aware the Dart Corona facility meets and has met a standard 0.8 lbs. less than the Rule 358 standard for several years. The Department has also observed block manufacturers updating equipment, changing to mid-range VOC beads, and installing controls. Based on this information, it is not unreasonable for the Department to believe that compliance with the Rule 358 standard is technically feasible. Therefore, the proposed standard is not arbitrary and capricious. Furthermore, since rule proposal, the Department has obtained additional information from Dart indicating the Corona plant manufactures products with a 4.2 pcf density that is very close to the high density product WinCup manufactures referenced in this comment. In prior conversations

with Wincup Phoenix plant staff, the Department was informed that this product makes up almost all of the high density production described in this comment. In addition, data from another Wincup facility shows a product with more than 4.5 pcf density molded at 3.0% pentane. Wincup need only reach 2.9% pentane using a 90% efficient ECS or 2.8% pentane using an 85% efficient ECS.

Comment #25: Finally, because it has proposed an emission standard rather than simply specifying the application of RACT, AQD should provide a more specific description of the method of measuring compliance with the limit. As acknowledged in the RACT Analysis, the WinCup facility operates on a continuous basis, unlike block or shape manufacturers which operate a batch process. In a batch process, it is possible to follow a discreet package of raw material to a singular batch of product and thus do compliance sampling at one location from one product. In a continuous process, raw beads are constantly being expanded into various pre-puff densities and sent to the various molding machines.

The proposed 3.2 lb. standard is expressed in the form of lbs. VOC per 100 lbs of raw beads processed. To measure the remaining VOC content in the processed raw material one must follow its distribution through the system. On average, the facility processes 100 lbs. of raw beads in approximately 4-5 minutes and the processed material is conveyed into various cup molding lines. Also, portions of the original 100 lbs. of raw bead are expanded to differing densities. Thus, the specific VOC content of this processed material varies in accordance with the degree of pre-expansion and aging, and measurement of that content requires representative sampling as it exits the RACT-specified pre-molding enclosure across the post-enclosure lines. WinCup requests that sampling under the standard be clarified to reflect, and be consistent with, the nature of the cup manufacturing process.

Response #25: The Department will work with EPS stakeholders and EPA to develop a testing procedure specific to the EPS industry that explains Rule 358 compliance determinations and the application of the provisions of Rule 270--Performance Tests. The Department does not believe that the nature of the process, whether continuous or batch, affects the way compliance is determined in the rule. Emission standards are frequently expressed in standard units that may or may not coincide with the specific characteristics of the products being regulated. Industry sectors typically encompass a wide range of products with different sizes and shapes. Furthermore, the EPS samples pulled to analyze for VOC content range from 0.3 to 1.5 grams per sample from blocks to the entire cup, which is frequently larger than the sample pulled from blocks.

During the rule development process, the Department clearly used the word “averaging” in draft rules whenever we considered allowing averaging among products. To support an averaging option, additional record keeping, calculation procedures, and monitoring provisions would also have to be added to the rule. Amending the rule to allow averaging for cup manufacturing would constitute a substantial difference from the notice of proposed rulemaking. Under A.R.S. 49-471.07.C, if the rule is substantially different from the proposed rule, the board of supervisors shall file a new notice of proposed rulemaking or a supplemental notice of proposed rulemaking. It is the Department’s interpretation that each of WinCup’s products must meet the cup standard.

Comment #26: Section 305 provides certain control performance requirements if "an ECS is required by this rule." It does not appear that that Rule 358 expressly requires an ECS.

Response #26: The commenter is correct. Rule 358 does not expressly require an ECS. While the wording in other parts of the rule reflects this, we inadvertently did not make the needed change to Section 305. We plan to make the correction after Rule 358 is adopted, when the rule is reopened to make any needed adjustments, after a sufficient period of experience implementing the rule.

Comment #27: Section 305.1(b) contains an hourly average outlet concentration limit of 20 milligrams of VOC per dry standard cubic meter. VOC is identified as non-methane organic carbon. This is stricter than the EPA definition of VOC in Section 51.100 (see page numbered 140). The EPA definition of VOC should be used. EPA recognizes VOC as non-methane, non-ethane, organic carbon.

Response #27: Maricopa County uses EPA’s definition of VOC. Ethane is not a VOC. VOC is not identified as non-methane organic carbon. Instead the rule states, “Express mass loading of VOC as milligrams of non-methane organic carbon.” In order to total mass from VOC compounds with different molecular weights, the analytical results must be converted to equivalents of a standard unit of mass. For VOCs, this standard unit equivalent is non-methane organic carbon. Methane and ethane can be speciated in the test samples and subtracted prior to converting the data to non-methane organic carbon. Section 503.3 addresses the commenter’s concern by specifically mentioning the test for ethane as well as methane.

Comment #28: Subsection 305.2 refers to a "pressure recorder that monitors the integrity of a permanent total-enclosure," which suggests that the pressure differential between the outside and inside of an enclosure is continuously monitored. [Our facility has] been trying to find such a device without success for several months. [Our] enclosure is huge by most standards for

permanent total enclosures, and the EPA standard [as expressed in EPA Method 204] for these enclosures is involves a very small pressure differential (0.007 inches of water). These two factors require that a very precise and accurate device be used to measure the pressure differential across the enclosure walls. Since such devices do not appear to be available, we request that the last portion of subsection 305.2 beginning with ", or a pressure ..." be removed.

Response #28: Pressure measurement is one among several examples given in subsection 305.2 and is not specifically required by the Rule. However, Department staff has observed such a device that monitors an enclosure that is enclosed, in part, by walls made of flexible, VOC-impervious fabric in a Phoenix facility.

Comment #29: Subsection 307.1(b) of Rule 358 requires that raw EPS beads be stored "in closed, leak-free, labeled containers when not in use". We want to know if the container-bags in which the raw beads are delivered meet these requirements, assuming that the bag itself is re-sealable and both the exterior bag and the liner sack are intact.

Response #29: The container-bags that the raw beads were delivered in will meet the requirements of "closed, leak-free, labeled containers" if all of the following conditions are met. The bag itself is re-sealable, the liner sack and the exterior bag (or box) are both intact, and the inner liner is sealed so that no opening is visible between the outside of the liner and the contents within. The outer bag or box may have minor imperfections or tiny openings if the inner sack's outer surface doesn't bulge into any imperfection or opening.

Section 500: Monitoring and Records

Comment #30: In Section 502.1c, justify its requirement to record the weight of each EPS block. This seems like an unnecessary intrusion on business, further adding to existing recordkeeping requirements for no apparent reason.

Response #30: There are two reasons for requiring records of block weights. The first is to easily determine block density when a facility is making specialty products (i.e., products having densities <0.8 pcf or ≥2.0 pcf). When making specialty products, a facility is allowed to use beads having much greater VOC-content than their permit normally allows. An AQD investigator can easily determine block density from its weight and dimensions. EPS blocks are made in standardized sizes, or can be measured directly with a tape-measure. Without the provision, the standard in 301.1 could not be enforced.

The second reason is to estimate post-molding emission and emission rates. Block weight (and thus the block density) is a factor in the determination emission estimates for stored blocks and regrind emissions. Once emission rates as a function of density, initial VOC-content, storage time, and temperature are experimentally determined, the block weight data allows more accurate estimates of actual emissions during storage and regrinding.

Comment #31: Section 503 (Test Procedures)

The commenter is concerned that the requirements in this condition are either not relevant, or are too ambiguous to provide useful guidance for EPS facilities. Due to the unique operational and emissions characteristics of EPS manufacturing facilities, it is not apparent how to apply these general principles to design a practical capture efficiency test for the entire manufacturing process. The difficulties that molders have experienced in obtaining approval on protocols for similar testing requirements in other jurisdictions (e.g. SCAQMD Rule 1175) are evidence of that fact. Premier requests MCESD to either provide specific instructions as to which of the referenced test methods/submethods are applicable, and specifically how to apply them, or to modify this condition to allow testing in accordance with a protocol "approved by MCESD."

Response #31: This provision is a standard testing provision in all VOC rules. While this determination normally takes place on a case-by-case basis, the Control Officer will work with EPS facilities and EPA to develop a testing procedure specifically for EPS facilities.

Comment #32: Subsection 503.1 states that each year a source test is to be performed. Although the scope of the source test has not been defined, [we believe] that the test will cost a minimum of $10,000, not including the additional costs incurred for impacts to its operations. If the source testing is to include development of emission factors, the testing costs will be even higher. [Company management] believes that this is an unfair burden that is being selectively placed on the EPS industry and therefore respectfully requests that the testing requirement be every five years.

Response #32: EPA specified that new Rule 358 should require annual source testing for sources that choose to comply with the rule's standard using an ECS. Specifically, EPA points out that the EPS industry has neither a CTG nor AP-42 emissions factors. In addition, none of the industries that do have AP-42 emission factors, or that have a track-record of mutually comparable performance-test results across the US, are similar to the EPS industry. There is no nationally agreed upon protocol for performance-testing of the EPS industry. Until valid surrogate monitoring methods have been identified through a sufficient collection of data garnered from

performance testing and the gathering of adjunct data that is accepted by Maricopa County and EPA, annual performance testing will be an essential means of monitoring compliance-status.

Finally, each EPS facility tends to be idiosyncratic in how it conducts the basic processing steps characteristic of its EPS category (cups, blocks, etc.). For example, from block facility to block facility, block molds vary in construction and how they are operated as to time, temperature, steam injection, and steam evacuation during the molding process. Moreover, at a facility the same machine may use different settings for each type of material processed. For example, settings for molding "one pound" material differ from settings for molding "pound and a half" material.

Comment #33: Subsection 503.1 states that the source test must be conducted between June 1 and August 31. There are a limited number of companies that can perform source tests, and the summer months is when most of them are scheduled. For example, many asphalt plants are shut down in the winter months, and commonly conduct their source tests in the summer when the plants are operating. Similarly, power plants operate seasonally, and typically conduct source tests when they operate at full load in the summer months. We do not understand the need to restrict the time of year when emissions are evaluated. We do not believe this type of limitation belongs in a rule. It places an unfair burden on the EPS industry, and may be impossible to comply with. Further, since all of the EPS manufacturers will have to conduct their tests around the same time, the cost for these tests will likely be higher. Since Maricopa County must review the test protocols and observe the tests, it will also place an unreasonable burden on Maricopa County. Accordingly, [we request] that references to the time of year when source tests are to be performed be removed from the rule.

Response #33: The Department has observed that a greater proportion of the initial raw bead VOC-content is emitted when processing is done in the warmest part of the year as compared to the rest of the year. For establishing permit conditions, an emission control system needs to be challenged to the same maximum degree as the system would be challenged in the course of a year's operation. In combination with the maximums for VOC-content and production rate desired by a facility's management, summer conditions maximize the challenge that the VOC in the raw materials makes on the ECS.

Comment #34: Section 503.9 Conforming Testing to Desired Production Characteristics: It will be necessary to define the term "each alternative operating scenario chosen". As the RACT analysis recognizes, compliance with the rule will be governed by a number of variables, including but not limited to raw material pentane content, aging time, and product density. It will not be feasible to predict, much less test, each possible combination of these variables. The wording of

this condition is far too open ended, and could result in highly impractical testing requirements for molders.

Response #34: This rule provision is intended to refer back to the Section 301 standard that provides for 2 standards. The second standard in Section 301.2 is labeled specialty product alternative operating scenario. Section 503.9 simply indicates that the EPS facility must conduct source tests while operating in compliance with Section 301.1 and test again while producing products that comply with Section 301.2. If a facility does not make products that can only be made under the Section 301.2 standard, then only the source test demonstrating compliance with Section 301.1 is required.

Rule 270 "Source Tests" governs how tests are conducted. Section 403 of Rule 270 states that, "Performance tests shall be conducted under such conditions as the Control Officer shall specify to the plant operator based on representative performance of the source or facility." Premier expresses concern over how representative performance will be defined and the conditions for testing established. While this determination normally takes place on a case-by-case basis, the Control Officer will work with EPS facilities and EPA to develop a testing procedure specifically for EPS facilities.

Comment #35: The formulas presented in subsection 503.7 are too restrictive, do not allow for the use of emission factors used to determine total emissions generated during a particular process of manufacturing and provide no alternate method of determining various values. Furthermore, the wording in subsection 503.7 states that "ECS effectiveness shall be determined from the results of a testing protocol based on mass balance, calculated according to the following formulas." We feel that the subsection should be revised to clarify that both mass balance methods and direct measurements may be used; that emission factors can be used; and to allow for use of other recognized methods of determining capture and control.

Response #35: Method 204 is the primary test method used to determine whether an operation meets the criteria for a total enclosure and therefore can be assumed to have 100% capture if all of the exhaust gases from the enclosure are ducted to a control device. Method 204 would be used if a facility intends that all manufacturing of EPS foam be within a total enclosure. Currently, several of the EPS block-makers in Maricopa County do not totally enclose all EPS foam processing operations to comply with Rule 358. Therefore, compliance by those block-makers will be determined by source testing that uses a mass balance approach, outlined in Section 503.7 of the rule.

In regards to emission factors see the response to Comment 32. Should the results of extensive testing eventually produce emission factors for any particular subset of the EPS molding industry, e.g., block-molding, the County will revise Rule 358 to reflect this.

Direct measurement can be an alternative, if general agreement can be reached with the Department and with EPA should results from enough facilities become available that show that the method has adequate precision and repeatability. As of this writing we don't have data that has come from direct measurement. For example, currently the Department hasn't received any data from direct measurements of out-gassing from EPS blocks and is unaware of any from another AQD. The Department is aware that initial protocols proposing to test block off-gassing during storage are under review. Should the results of extensive testing eventually produce trusted sets of direct measurements for any particular subset of the EPS molding industry, the County will change Rule 358 to reflect this. Similarly, if other methods subsequently approved by EPA apply to EPS processing in Rule 358, we will change Rule 358 to reflect this.

Comment #36: The definitions in Section 503.7 should be more precise. For example, the proposed draft language states that "VOCp is the VOC content of the products made from the weighted raw beads." Suggested alternative language is as follows:

VOCp is the weighted average initial VOC content of the products (block, cup, ...) made from the raw beads processed.

Response #36: The Commenter erred in the citation of the definition. The definition states: "…. products made from the weighed raw beads", not "…the weighted raw beads"

Comment #37: The Section 503.7 calculation of percent control may not always be accurate. For example, [one facility's] RTO consumes natural gas to combust the VOC emitted from expanding the EPS beads. Some of this natural gas exits the stack as VOC. The percent control calculation assumes the natural gas VOC content exiting the stack is a negligible percent of the VOC total, which may not always be true. Suggested alternative language is as follows:

% Control =

where VOC_{ECS} is the VOC (lb/hr) measured in the gas stream entering the control (for example, RTO)

VOS_{St} is the VOC (lb/hr) measured exiting the control (for example, RTO)

VOS_{StNG} is the VOC (lb/hr) measured exiting the control (for example, RTO) that is from the natural gas used to heat the control

Note that Section 503.7 leaves out the term VOC_{StNG}.

Response #37: Our performance test engineers are aware of methane slip and use the methods already referred to by the rule to detect organic compounds created by auxiliary combustion fuel used by the control device. The issue can be resolved by the facility, its tester, and the County test engineers in the course of reaching agreement on the test protocol. Because Maricopa County's definition of VOC follows the EPA definition, which excludes both methane and ethane, we see no need to revise the formula for calculating percent control. In addition, Section 503.3 addresses this issue by specifically mentioning the test for ethane as well as methane.

RACT ANALYSIS COMMENTS

Comment #38: Page 5, second paragraph. The word pellets should be changed to beads. The term EPS pellets should not be used in any description of the molded EPS bead industry.

Response #38: The word "pellet" was removed from the RACT Analysis. The word "bead" was substituted where applicable.

Comment #39: Page 5, third paragraph. When referring to loose fill, the word beads should be changed to raw material. Loose fill raw material can be some other shape than beads.

Response #39: We made the suggested change.

Comment #40: Page 12, second paragraph. The manufacturers' goal for prepuff density is to produce a density that results in the intended density of the finished product. The prepuff density and the final molded part density may not be exactly the same.

Response #40: We changed the statement to: "The beads are preexpanded at below the expected final density (usually there is less than 3 % increase in density), since puff tends to shrink slightly and thereby gain density through the process." In the next paragraph we now refer to prepuff density after aging is complete.

Comment #41: Page 12, last paragraph. Although it may be reasonable to conclude that "the lower the initial pentane content, the shorter the required aging time", I have not seen any data that this is always the case.

Response #41: We deleted the final sentence that made the quoted assertion.

Comment #42: Page 14, first paragraph. There is no data presented to be able to state there is no change in gross density of the molded product when compared to the gross density of the prepuff. This statement should be eliminated.

Response #42: We modified the statement to say: "Assuming that charging the mold with a volume of puff equal to the volume of the mold is standard practice, the average maximum diameter of the globules does not change and there is little or no change in the gross density of the molded product."

Comment #43: Page 16, third paragraph. There is no data to support a statement that concludes that a 3.6% bead-type will lose a smaller percent of its initial VOC than a bead-type containing 5.5% or more VOC made in the same machine at the same density.

Response #43: A BASF study of their EPS products' performance provided the supporting data for the assertion (Technical Bulletin N-840, February 1999). The test produced EPS shape products from the same mold with puff of the same (1.2 pcf) density expanded from batches of 2 different bead VOC contents. When the puff was aged the 6 hours, the shape made from 5.8 lbs VOC/ 100 lbs beads lost 45% of its initial VOC, while the shape made from 3.5 beads lost just 36% of its initial VOC. When the puff was aged 24 hours, the shape made with the 5.8 lbs VOC/ 100 lbs. bead lost 61% of its VOC, while the shape made from the 3.5 beads lost just 47% of its VOC.

For blocks at a 0.9 pcf density made from puff aged 24 hours, the blocks made from 6.1 lbs and 5.5 lbs VOC/100 lbs beads (same bead model, but not the same lot) had lost 51% and 54% of their initial VOC content while the block made from 3.5% beads had lost 47%. (When the puff made from the 3.5 block-making beads was aged just 6 hours, it lost 41% of its VOC.)

These results for 3.5 beads can be compared with the results of another experiment by a different bead manufacturer. Puff from beads containing 6.7 lbs VOC/ 100 lbs was expanded to a density of 1.18 pcf and aged for 24 hours. This produced a block with 1.59 lbs VOC/ 100 lbs, a loss of

76%. When a different batch of the same bead model that contained 6.2 lbs VOC/ 100 lbs was made into 0.93 pcf puff and aged 24 hours, it produced a block with 2.04 lbs VOC/ 100 lbs. This is 67% below the initial bead VOC content.

Comment #44: Page 20 6.1.1.1 The aging of a molded product to its final use is a function of water removal and not pentane diffusion. Therefore some of this statement is not correct.

Response #44: There are three reasons to store EPS blocks after molding. The first is to allow the hot, soft polymer to cool and become rigid. The second is to allow enough time for water within the block to evaporate and the water vapor to become so diluted with air that it cannot recondense within the block to prepare the block for cutting or other machining. The third is to allow the combustible blowing agent, pentane, to escape – eventually leaving little pentane within the foam-block so that the fire retardant chemical(s) built into the EPS can be effective. This will allow construction boards made from the block to meet rigorous fire-safety tests and qualify the boards for use in structures.

Comment #45: Page 20 6.1.1.1 To make a statement that the lower VOC content material is a better purchase can be completely false. Low VOC materials are more difficult to process and therefore can result in more scrap generation and thus increased costs.

Response #45: We qualified the statement with the words "with equivalent performance." Equivalent performance implies that processing outcomes are the same.

12. Any other matters prescribed by statute that are applicable to the specific department or to any specific rules or class of rules:

None

13. Incorporations by reference and their location in the rules:

New incorporations by reference	**Location**
Bay Area Air Quality Management District, BAAQMD Manual of Procedures, Method 45, Volume III	Section 504.5
South Coast Air Quality Management, AQMD Method 306-91, 1993 revision	Section 504.6

EPA Test Method 204 a,b,c,d,e and f	Section 504.4
40 C.F.R.51, Appendix M	
ASTM International	
ASTM Method C303-02	Section 504.8

Incorporations by reference updated to 7/1/03	**Location**
40 C.F.R. 60, Appendix A	Section 504

14. Was this rule previously made as an emergency rule?

No

15. The full text of the rule follows:

RULE 358

POLYSTYRENE FOAM OPERATIONS

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RULE 358

POLYSTYRENE FOAM OPERATIONS

SECTION 100 – GENERAL

101 **PURPOSE:** The purpose of this rule is to limit the emissions of volatile organic compounds (VOCs) from the manufacturing of expanded-polystyrene products.

102 **APPLICABILITY:** This rule applies to any facility that expands, ages, or molds expandable polystyrene (EPS).

SECTION 200 – DEFINITIONS: See Rule 100 (General Provisions And Definitions) of these rules for definitions of terms that are used but not specifically defined in this rule. For the purpose of this rule, the following definitions shall apply:

201 **BEAD-LOT and BEAD-LOT IDENTIFIER** – A specific selection of a specific quantity of expandable polystyrene material, all portions of which typically share similar properties. This selected material has been tested in accordance with standard quality-control procedures and is traceable to the time and date on which it was packaged. Traceability is enabled by a bead lot identifier or lot number, which is a unique numeric (or alphanumeric) string that is permanently coupled with the selected material. The lot number always appears on one or more formal transfer/receipt documents retained by both the seller and the buyer, and identifies the material's plant of manufacture as well as the date that it was packaged.

202 **BLOCK (EPS FOAM BLOCK) –** A block-shaped solid made of EPS foam that was molded as a unit. Typically, a block's depth and width each exceed 23 inches (0.6 m) and a length exceeding 95 inches (2.4 m).

203 **BLOWING AGENT –** Any substance that, alone or in conjunction with other substances, is capable of producing a cellular (foam) structure in a polymeric material by inflation.

204 **CUP MOLDING –** The process of making cups, bowls, and similar containers by molding expanded polystyrene globules (prepuff).

205 **DAY -** Any 24-hour period beginning at 12:00 AM, midnight.

206 **EMISSION CONTROL SYSTEM (ECS) –** A system for reducing emissions of volatile organic compounds, consisting of a capture system (e.g., enclosures, hoods, and ductwork) and control device(s). An ECS may also include gas conditioning equipment such as condensers or prefilters.

207 **EPS BEADS (EXPANDABLE POLYSTYRENE BEADS) –** Polystyrene beads, particles, or granules, usually less than one-twelfth inch in diameter, that are formulated with a blowing agent (typically 3.5% to 7% of bead weight). When subjected to prescribed heating in an expansion system, the beads puff up, expanding many times their original volume into low density foam globules (called "prepuff" or "puff") from which a variety of EPS foam products are molded.

208 **EPS FOAM (EXPANDED POLYSTYRENE FOAM) –** A lightweight, naturally white, foam material, made of polystyrene, from which a variety of common items are made, such as ice-chests, insulation board, protective packaging, and single-use cups.

209 **LOOSE FILL –** Small, expanded polystyrene forms produced in a variety of shapes that are used as packing material or as stuffing in furnishings. These foam products typically have a density below 6/10 of a pound per cubic foot (pcf).

210 **NONPRECURSOR ORGANIC COMPOUND –** Any of the organic compounds that have been designated by the EPA as "exempt" (having negligible photochemical reactivity). A listing of the compounds is found in Rule 100 of these rules and regulations.

211 **POLYSTYRENE –** Any grade, class, or type of thermoplastic polymer, alloy, or blend that is composed of at least 80% polymerized styrene by weight.

212 **PREPUFF or PUFF** – Expanded polystyrene globules, prior to molding, formed from EPS beads/granules that have been processed in an expander. No grind/regrind material (i.e., expanded EPS that has been through a grinder) or material within a grinding system is considered to be prepuff.

213 **SHAPE –** An object made out of EPS that has been molded into a shape other than that of a block, cup, or bowl.

214 **SPECIALTY BLOCK-PRODUCTS** – For the purposes of this rule, a specialty block product is an EPS block or block-derivative (e.g., board, architectural form, etc.) that meets either of the following criteria:

214.1 Has a density of 2.0 pounds per cubic foot or greater, as determined by ASTM Method #C303; or

214.2 Has a density less than 0.8 pounds per cubic foot as determined by ASTM Method #C303.

215 **VOLATILE ORGANIC COMPOUND (VOC) –** Any organic compound that participates in photochemical reactions, except nonprecursor organic compounds.

216 **VOC CONTENT OF RAW EPS –** For the purposes of this rule, there are 3 different expressions for stating the VOC content of raw EPS beads/granules. Each of these expressions must be made in terms of either the number of pounds of VOC per 100 pounds of beads or the percentage of overall weight (including the VOC weight) that the incorporated VOC constitutes. The percent value shall be expressed with a precision of no less than the nearest tenth of one percent, which is equivalent to expressing the same number value in pounds VOC per 100 lbs. beads, to the nearest tenth of a pound. The acceptable expressions are:

216.1 **Manufacturer-Certified Bead-Lot (MCBL) VOC-Content** – A document such as a standard Certificate Of Analysis that numerically presents an EPS bead-lot's VOC content and must contain all of the following elements:

a. The VOC content printed or written on a paper document by the bead manufacturer, after the manufacturer has had the bead-lot tested to determine the lot's percent VOC, before shipping from the manufacturer; and

b. The manufacturer's name and the bead-lot, identified on the paper document with the appropriate bead-lot identifier; and

c. The signature of an officer of the manufacturing facility or the signature of an officer's designee, previously designated in writing by such an officer.

216.2 **Post-Manufacture Laboratory-tested (PMLT) VOC-Content:** The results of a laboratory test determining the VOC content of a representative sampling of an intermediate or finished expanded polystyrene-product, or such a test of raw beads any time after their MCBL VOC content has been assigned.

216.3 **ISO-Certified Maximum Bead-Model (IMBM) VOC Content:** A numerical value that represents the upper limit of a particular bead-model's VOC-content, which has been:

a. Initially stipulated by the bead-model's manufacturer in a document that gives the bead-model's unique identifier, and

b. Subsequently certified for accuracy by the International Standards Organization (ISO).

SECTION 300 – STANDARDS:

301 **BLOCK MAKERS**: An owner and/or operator of an EPS block-making facility shall comply with subsection 301.1 and, if applicable, subsection 301.2 of this rule.

301.1 Limit the sum of both the VOC that escaped to atmosphere and the residual VOC in the resulting blocks at the time they are released from the molding machine to not more than 3.0 pounds for every 100 pounds of raw beads processed.

301.2 **Specialty Products Alternative Operating Scenario:** When producing specialty block-products solely from raw EPS beads that exceed a VOC-content of 5.5 percent by weight, an owner and/or operator may choose the standard in subsection 301.2(a) by which to comply with this rule, but only if the requirements in subsections 301.2(b), and 301.2(c) are met.

a. Limit the sum of both the VOC that escaped to atmosphere and the residual VOC in the resulting blocks at the time they are released from the molding machine to not more than 3.9 pounds for every 100 pounds of raw beads processed (3.9 lbs/100#), and

b. Taking into account the total weight of all beads processed each year, limit the portion of that weight that is processed under the 3.9 lbs./100# standard to the percent allowed each year by Table I.

TABLE I

ANNUAL PERCENTAGE LIMITS FOR SPECIALTY PRODUCTS MADE UNDER THE SUBSECTION 301.2a STANDARD

Column A	Column B
CALENDAR YEAR OF COLUMN B LIMIT	Maximum Percent Of All Raw-Beads Processed Each Year That Are Allowed To Be Processed Under The 3.9 Lb/100# Standard For Specialty Products Only
2006	10.0
2007	9.0
2008	8.0
2009	7.0
2010	6.0
2011 and continuing	5.0

c. The proportion of annual raw-material throughput that is produced under the section 301.2(a) standard shall be calculated and recorded according to Section 502.1(d).

302 **SHAPE MAKERS:** An owner and/or operator of an EPS shape-making facility shall limit the sum of the VOC that escaped to atmosphere and the residual VOC in the resulting shapes to 2.7 pounds for every 100 pounds of raw beads processed.

303 **CUP MAKERS**: An owner and/or operator of an EPS cup-making facility shall limit the sum of the VOC that escaped to atmosphere and the residual VOC in the resulting cups to 3.2 pounds for every 100 pounds of raw beads processed.

304 **LOOSE FILL MAKERS:** An owner and/or operator of a facility that makes expanded polystyrene loose fill shall limit the sum of both the VOC that escaped to atmosphere plus the residual VOC in the finished loose fill (measured right after the final curing process) to

not more than 2.4 pounds for every 100 pounds of raw EPS materials processed into finished loose fill.

305 PERFORMANCE OF ECS CONTROLLING VOC EMISSIONS: If an ECS is required by this rule, comply with subsections 305.1, 305.2, and 305.3 of this rule.

305.1 The control device (abatement subsystem) of such ECS shall comply with either subsection 305.1(a) or subsection 305.1(b) of this rule.

a. Reduce the weight of VOC-as-carbon that enters the control device by at least 94 percent; or

b. Maintain an hourly average outlet concentration of VOC below 20 milligrams per dry standard cubic meter. Express mass loading of VOC as milligrams of non-methane organic carbon.

305.2 Each ECS that is operated in order to comply with this rule shall be equipped with monitoring devices capable of demonstrating that the ECS is operating in a manner that assures compliance with this rule. The monitoring devices shall be installed, calibrated, maintained, and operated according to their manufacturers' instructions and the O&M Plan. Typically, such devices provide temperature, pressure, flow-rate, or other indicator(s) of proper ECS function (such as a continuous temperature recorder that monitors an oxidizer's combustion chamber or a condenser's outlet duct, or a pressure recorder that monitors the integrity of a permanent total-enclosure, etc.).

305.3 Records shall be kept according to Section 502.3 of this rule.

306 ECS OPERATION AND MAINTENANCE (O&M) PLANS:

306.1 An owner and/or operator shall provide, implement, and maintain an O&M Plan for each ECS required by this rule. The O&M Plan shall include the monitoring device(s) associated with the ECS.

306.2 The owner and/or operator shall submit to the Control Officer for approval the O&M Plan of each ECS, with its associated monitoring device(s), that is used

according to Sections 301.1, 301.2, 302, 303, or 304 of this rule. Also include in such O&M Plans:

a. Procedures for collecting and recording required data and other information in a form approved by the Control Officer, which shall include data collected through the O&M Plan and through the monitoring of key system operating parameters; and

b. Procedures and schedules for preventive and corrective maintenance performed for the purpose of maintaining the emission control system in proper operating condition.

306.3 An owner and/or operator of an EPS facility must comply with all O&M Plans that the owner and/or operator has submitted for approval but which have not yet been approved, unless notified otherwise by the Control Officer in writing.

307 VOC CONTAINMENT, IDENTIFICATION, AND DISPOSAL:

307.1 Contain VOC-Emitting Material:

a. When they are not in use, store all fresh and used non-EPS VOC-containing material in closed, leak-free containers that are labeled according to subsection 307.4. Such materials include but are not limited to cleaning solvents, inks, coatings, thinners, and their residues including residues on rags; and

b. Store raw EPS beads in closed, leak-free, labeled containers when not in use.

307.2 Materials addressed in Section 307.1 of this rule may be placed in an enclosure ducted solely to an ECS that is approved by the Control Officer, instead of in closed containers.

307.3 The owner and/or operator must implement procedures to minimize spills of VOC-containing materials described in subsection 307.1(a) of this rule, during

their handling and transfer to or from containers, vats, enclosed systems, waste receptacles, and other equipment, whether the material is fresh, used, or waste.

307.4 Identification and Labeling:

a. Containers used for initial, intermediate, or final storage of VOC-containing materials addressed in subsection 307.1 of this rule shall be clearly labeled with their contents.

b. Content-labeling done according to the requirements of federal hazardous waste (RCRA) or occupational safety (OSHA) statutes and codes meets the requirements in subsection 307.4(a) of this rule.

308 EXEMPTION:

308.1 Exemption from Sections 301.1 through 306.3: An owner and/or operator of a facility is exempt from the requirements of Sections 301.1 through 306.3 of this rule if the total VOC content of all raw EPS material processed by the facility is, in each calendar year, below 50 tons (100,000 lbs.) and, in each calendar month, below 12,000 pounds.

308.2 Burden of Proof: A person claiming any exemption from this rule or from a provision of this rule shall provide adequate records to verify and maintain any exemption. These may include records of raw material used, laboratory analyses, technical data sheets, and/or performance test results.

SECTION 400 - ADMINISTRATIVE REQUIREMENTS

401 COMPLIANCE SCHEDULE: A person or owner/operator of a facility that is subject to Sections 301, 302, 303, or 304 of this rule shall comply with the following increments of progress:

401.1 By July 20, 2005, the owner and/or operator shall comply with Section 502 through 502.2c of this rule;

401.2 By August 20, 2005, the owner and/or operator either must submit an application or have been issued a revised permit that addresses the installation

and operation of the equipment to be used to achieve compliance with this rule; also, comply with Sections 307.1 through 307.4 of this rule ;

401.3 By April 20, 2006, the owner and/or operator must complete the installation of all equipment required to meet the provisions of this rule, and also comply with all O&M Plan requirements in Section 306 , and Section 502.3; and

401.4 By October 20, 2006, the owner and/or operator must comply with the applicable standards in Sections 301, 302, 303, 304, and 305 of this rule.

SECTION 500 - MONITORING AND RECORDS

501 RECORDS:

501.1 **General:** Records shall be kept complete and up-to-date, in a consistent and legible format.

501.2 **Retention:** Records required by this rule shall be retained for at least 5 years.

501.3 **Use of Other Records:** Records that are kept by an EPS facility for other agencies or purposes may be submitted to the Control Officer to meet the record requirements of this rule, provided such records contain the necessary information according to Section 502 of this rule.

502 RECORDKEEPING SPECIFICS:

502.1 **Tracking EPS Beads**: Effective July 20, 2005, a person subject to this rule shall comply with the following requirements, as applicable.

a. **Lot ID and VOC Content:** Prior to expanding any part of a bead-lot, an owner and/or operator shall obtain and retain an original or copy of the VOC-content, as defined in Section 217 of this rule, for each separate lot-number/identifier of beads received.

b. **Total Expanded, By Lot and Date:** Each day that raw EPS material is expanded in a facility's expander, an owner and/or operator shall record

the amount of each bead-lot expanded and its corresponding lot number/identifier.

c. **Block-makers:** Each day that blocks are made, record the approximate weight of each newly molded block, measured to the nearest 2 pounds.

d. **Specialty Products Subject to Section 301.2(a):** An EPS-block facility owner and/or operator making specialty products under Section 301.2(a) shall:

(1) Maintain a log indicating when the facility is operating under the specialty-products alternative operating scenario; and

(2) Each month calculate the percent of total EPS raw material used during the current calendar year that specialty products, made under section 301.2(a), constitute; enter the calculations and results in the log.

502.2 **Lists of Non-EPS VOC-Containing Materials**: Non-EPS materials may include, but are not limited to, the following categories: inks, coatings, adhesives, reducers, thinners, solvents, cleaning materials, additives, spray-cans, sprayed lubricants, and any other VOC-containing materials that are not EPS.

a. An owner and/or operator shall maintain a current list of non-EPS materials, containing VOC, used at the facility. A complete and ordered assemblage of the required data meets the requirements for a list.

b. An owner and/or operator shall express VOC content of non-EPS material in one of the following three forms:

(1) Pounds VOC per gallon (or grams VOC per liter), or

(2) Fractional pounds of VOC per lb. material (or grams per kilogram), or

(3) The percent VOC by weight along with the specific gravity or density (2 numbers are required for each entry).

c. By the end of the following month, an owner and/or operator shall record the amount and type of each non-EPS material, containing VOC that was used during each month.

502.3 **Records Of ECS Operation And Monitoring:** On a daily basis, the owner and/or operator of a facility that operates an ECS to comply with this rule shall record key system operating parameters such as temperature, flow rate, pressure, and/or VOC-concentration, etc.

503 **TEST PROCEDURES**: An owner and/or operator of an EPS facility will be in violation of this rule if the VOC emissions, measured by any of the referenced test methods specified in this Section 503 and listed in Section 504 of this rule, do not comply with the applicable standards included by Sections 301 through 305 of this rule.

503.1 Each year between June 1 and August 31, an owner and/or operator shall conduct an annual performance test on each ECS used to meet a standard in this Rule 358, using the test methods designated by subsections 503.2 through 503.7 and incorporated by reference in Section 504 of this rule.

503.2 An owner and/or operator shall perform the measurement of airflow and gas flow into and out of the ECS by performing EPA Method 2, referenced in Section 504.1 of this rule.

503.3 An owner and/or operator shall determine the concentration of methane and ethane emissions by performing EPA Method 18, referenced in Section 504.2, or Method 25 (and its submethods) referenced in Section 504.3 of this rule.

503.4 An owner and/or operator shall determine the control efficiency of the VOC control device (abatement subsystem) of an ECS by performing EPA Method 25 (and its submethods), referenced in Section 504.3 of this rule.

503.5 An owner and/or operator shall determine the efficiency of a capture system according to both EPA Method 204 (and its submethods) referenced in Section 504.4 and the EPA guidance document referenced in Section 504.7 of this rule.

503.6 An owner and/or operator shall determine the concentration of total volatile organic carbon content in polymeric materials by performing Bay Area Quality Management District (BAAQMD) Method 45 as referenced in Section 504.5 of this rule or by performing South Coast Air Quality Management District (SCAQMD) Method 306-91, 1993 revision, as referenced in Section 504.6.

503.7 **Determination of ECS Effectiveness:** ECS effectiveness shall be determined from the results of a testing protocol based on mass balance, calculated according to the following formulas:

$$\% \text{ CAPTURE} = \frac{VOC_{ECS}}{VOC_I - VOC_P} \times 100$$

$$\% \text{ CONTROL} = \frac{VOC_{ECS} - VOC_{St}}{VOC_{ECS}} \times 100$$

$$\% \text{ EMITTED} = \frac{VOC_I + VOC_{St} - VOC_P - VOC_{ECS}}{VOC_I - VOC_P} \times 100$$

$$\% \text{ OVERALL (Capture+Control)} = \frac{VOC_{ECS}}{VOC_I - VOC_P} \times \frac{VOC_{ECS} - VOC_{St}}{VOC_{ECS}} \times 100$$

Where:

VOC_I is the VOC input in the form of the VOC content of a weighed mass of raw beads.

VOC_P is the VOC content of the products made from the weighed raw beads.

VOC_{ECS} is the VOC measured in the air entering the ECS.

VOC_{St} is the VOC remaining in the gas stream(s) emerging from the ECS during production.

503.8 **Determination of Product Density:** The ASTM Method #C303-02 referenced in Section 504.8 shall be used to determine the density of EPS foam blocks and block-derivatives.

503.9 **Conforming Testing to Desired Production Characteristics:** The owner and/or operator of an EPS facility must, through performance testing, demonstrate compliance with each alternative operating scenario chosen.

504 **TEST METHODS ADOPTED BY REFERENCE**: The EPA test methods as they exist in the Code of Federal Regulations (C.F.R.) on July 1, 2004, are adopted by reference. These adoptions by reference include no future editions or amendments. Copies of test methods referenced in this Section are available at the Maricopa County Environmental Services Department, 1001 North Central Avenue, Phoenix, AZ, 85004-1942. The other test methods from Bay Area Air Quality Management District and South Coast Air Quality Management District listed herein are also adopted by reference, each having paired with it a specific date that identifies the particular version/revision of the method that is adopted by reference.

504.1 EPA Reference Method 2 (“Determination of Stack Gas Velocity and Volumetric Flow Rate”), 2a (“Direct Measurement of Gas Volume Through Pipes and Small Ducts”), 2c (“Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts”), and 2d (“Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts”), (40 C.F.R. 60, Appendix A).

504.2 EPA Reference Method 18 ("Measurement of Gaseous Organic Compound Emissions by Gas Chromatography"), (40 C.F.R. 60, Appendix A).

504.3 EPA Reference Method 25 ("Determination of Total Gaseous Nonmethane Organic Emissions as Carbon"), (40 C.F.R. 60, Appendix A).

504.4 EPA Reference Method 204 ("Criteria for Determining Capture Efficiency"), 204A, 204B, 204C, 204D ("Volatile Organic Compounds Emissions in Uncaptured Stream from Temporary Total Enclosure"), 204E ("Volatile Organic Compounds Emissions in Uncaptured Stream from Building Enclosure"), and 204 F (“Volatile Organic Compounds Content in Liquid Input Stream {Distillation Approach}") (40 C.F.R. 51, Appendix M).

504.5 BAAQMD Method 45 ("Determination of Butanes and Pentanes in Polymeric Materials"), (BAAQMD Manual of Procedures, Volume III, January 19, 2000).

504.6 SCAQMD Method 306-91, February 1993 revision ("Analysis of Pentanes In Expandable Styrene Polymers"), Applied Science & Technology Division – Laboratory Services Branch.

504.7 EPA Guidance Document, "Guidelines for Determining Capture Efficiency", January 9, 1995.

504.8 American Society of Testing Materials, ASTM Method #C303-02 (Standard Test Method for Dimensions and Density of Preformed Block and Broad-Type Thermal Insulation), 2002.